

Wisconsin Meeting Notes

David Moyer's notes from the meeting in Madison, Wisconsin, held on August 8, 2001:

User Forum, Spatial Reference System Requirements for Wisconsin

Tuesday morning was devoted to a User Forum on the Spatial Reference System Requirements for Wisconsin to provide suggestions for input to the National Oceanic and Atmospheric Administration (NOAA) report to the U.S. Congress. The request for a report from NOAA is contained in House Report 107-139, which accompanied House Resolution 2500.

Juliana Blackwell, a geodesist with National Geodetic Survey (NGS) headquarters staff in Silver Spring, Maryland is taking the lead preparing the report for Congress. Blackwell noted the very short time frame available (report is due September 15, 2001), and that NOAA and Department of Commerce clearance of the report are also required.

Blackwell distributed a draft of the report and provided an overview of its contents. She noted an important goal of NGS is to provide a reliable, cost-effective, standardized, legally established national reference datum, and that height modernization is aimed at modernizing and improving the vertical component of that national spatial reference system. She noted the section on benefits expected to result from height modernization and invited Forum participants to comment and expand on requirements and benefits noted in the draft.

The draft report contains recommendations for both the Wisconsin and Louisiana Height Modernization Program (HMP). Draft recommendations for Wisconsin included:

- C accelerate the completion of the Wisconsin Height Modernization Program (WI-HMP) from 10 years to five years,
- C promote Wisconsin as a role model and trainer for other states in height modernization,
- C explore opportunities for additional funding to support and accelerate the WI-HMP,
- C establish a Wisconsin Spatial Reference Center (WSRC) in partnership with the State Cartographer's Office.

Louisiana recommendations in the draft report include combining GPS and leveling to provide a basic framework needed to support the Louisiana Height Modernization Program, expanding the CORS network and exploring the use of mobile monitoring systems (for ellipsoid height determination) and extensometers (to detect subsidence), and establishing a Louisiana Spatial Reference Center.

In the discussion that proceeded for the remainder of the morning session, Forum participants made the following comments, suggestion, and raised the following questions.

Thus far, only benefits to the Wisconsin Department of Transportation (WisDOT) programs have been used to justify the WI-HMP. These WisDOT benefits are expected to recoup the projected 10-year

\$16 million in less than seven years. If the WI-HMP can be accelerated, (e.g., to five years instead of 10) and when the many non-transportation uses of improved vertical data are included, the benefit cost ratio is even more favorable.

A 1997 study of the Lake Michigan shoreline used Real Time Kinematic (RTK) GPS techniques to measure/monitor shoreline erosion. Frank Scarpace and Alan Vonderohe of the College of Engineering at the University of Wisconsin-Madison were the principal investigators on this project, with cooperation of WisDOT Geodetic Surveys Unit (GSU).

Needs – It was suggested that the precision farming needs for improved vertical (and horizontal) data in the Central Sands area of Wisconsin be explored and discussed in the report. The Central Sands region is a major producer of vegetables, using irrigation and extensive use of fertilizers and pesticides to enhance production. Improved vertical data will reduce runoff (of both surface and ground water), providing benefits of both reduced runoff pollution and reduced cost of production (increasing net revenue) in these intensive agriculture areas. Additional information will be requested from the Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) to document the relationship of precision agriculture to more accurate vertical and horizontal information.

Comment – Some forum participants were concerned about the WSRC recommendation. Specific concerns:

- C If a WSRC is established, it must meet the needs of all users and beneficiaries of improved vertical (and horizontal) geodetic data.
- C The WI-HMP provides for bluebooking of all data so that it can be placed in the National Spatial Reference System (NSRS) database maintained by NGS. The WI-HMP approach also provides for the efficient distribution of geodetic data via the web.
- C Funds (that are already scarce) might be diverted from the WI-HMP data collection to cover other costs, such as a WSRC.

Needs – Use maps and bar charts to show decline in quality of vertical network. For example:

- C for phases 1 through 5 of the WI-HMP, plot the bench marks as contained in the NSRS of NGS. Then show graphically the results if reduced by:
 - S marks not found in field recovery
 - S marks that are classified as less than B stability (i.e., C codes)
 - S marks that cannot be surveyed with GPS equipment, due to obstructions

Benefits – Dr. David A. Hart, of the University of Wisconsin-Madison suggested that benefits should include both direct and indirect benefits (as currently drafted, the section includes only direct benefits). For example, Dr. Hart noted the following indirect benefits that will result from improving vertical geodetic data for Wisconsin:

- C improved digital elevation model (DEM) of Lake Michigan and Lake Superior shoreline (to support new methodology for setback evaluation and determination that is being developed)
- C combined bathymetric and vertical data model of shoreline
- C support for the Wisconsin Water Initiative that is being carried out by the Wisconsin Department of Natural Resources (DNR), to improve floodplain mapping across the state (as has been done in the pilot area of Winnebago County). See “Making Waves in Floodplain Mapping - Winnebago County Modernizes Land Records,” Land Information Bulletin Number 2, Summer, 1998, Land Information and Computer Graphics Facility, University of Wisconsin-Madison.
- C a State Elevation Data Task Force, established by the Wisconsin Land Information Board, is currently working on a report to document the needs and uses for vertical data and the options for collecting and sharing this data state wide. The existence of this Task Force itself indicates the critical nature of the vertical data shortfall in Wisconsin, and the commitment of the State to move forward as rapidly as possible to address these deficiencies.
- C The State annually conducts a web-based survey of counties, to monitor the status and progress of the Wisconsin Land Information Program (WLIP), established in 1989 to modernize all land records in the state. The WLIP survey contains specific questions regarding geodetic data that may be useful in the report.

Web site: www.doa.state.wi.us/olis

Wisconsin Land Information Program, then 2000 LIO Survey

Question – Will the “requirements” section of report include specific request, need level for additional funds? Answer: Not directly, but will include information from which dollar resource needs can be inferred.

Comment – Given the State estimate of the 10-year cost of \$16 million, a request for \$1.5 million per year federal cost share would seem reasonable, and needed if the program is to be accelerated by 50 percent reductions in total time to complete.

Comment – Need to acknowledge the continuing use of NAD 27 and NGVD 29 in the 7 Southeastern Wisconsin Regional Planning Commission (SEWRPC) counties, and how to assist them in making the conversion to NAD 83 and NAVD 88. Universal support of WI-HMP, including SEWRPC part of the State, will enhance the likelihood of success.

Comment – Need to relate to headlines with which Congress would be familiar, such as railroad flooding, rivers out of a bank, out of floodway, high or low lake levels, etc. Pictures would be good way to catch attention for specific areas of need as well.

Dr. Hart and Jerry Sullivan, Wisconsin Department of Administration, noted the existence on the web of several “photo gallery” sites. They agreed to provide addresses and examples of photos that may be useful in the report.

Needs/uses, examples mentioned:

- C decreasing lake levels (caused by water level decline or glacial rebound of “a choke point” at a lake outlet?)
- C need for hydrologic monitoring of water levels
- C shoreline erosion (where and rate)
- C floodplain, evacuation routes, based on best DEM

Dam Burst Analysis – Wisconsin DNR responsible for analysis of more than 20,000 dams (with many more private dams needing same type of data and analysis). Accurate vertical data needed to show down stream flooding that would occur if a dam failed. (Many of these dams are quite old, therefore, analysis is needed and becoming more critical with each passing month.) Accurate DEM is needed to provide accurate description of flow and danger zones (especially critical in densely populated areas of State).

Recent flooding and deaths of persons using the State rivers would be reduced with more accurate data on water levels and their implications for boater safety.

Need – Improved vertical data to support the Wellhead Protection Program of the Wisconsin Geological and Natural History Survey (part of the University of Wisconsin).

Recent headline – Fish kill in Black Earth Creek, one of the premier trout streams in central U.S. Ten inches of rain fell in 24 hours. Data on non-point pollution sources, water flow models, etc., are needed for analysis of this incident and development of measures to prevent this from happening again.

Benefits – Direct benefits of the WI-HMP to contractors and consultants who are under contract to assist in carrying out the work. (Similar analysis for the WLIP was included in Land Information Modernization Activity in Wisconsin: Impacts, Status, and Future Tasks, 1990-2000, pp. 12-13.) This shows the specific benefit to business and commerce, in addition to the general benefits to the State in general. It was also noted that 80 percent of leveling work on the WI-HMP phases completed thus far has been completed by contractors.

Benefit: Avoided Cost – Recent problem with vertical error in surveying project High Speed Rail project (Chicago to Minneapolis). More than 100 hours of survey work needed to be repeated, more than 100 hours of additional analytical triangulation were required for revised data, two month delay in time lost by contractors waiting on corrected data, and the errors were carried over to the next section of the rail corridor survey work. An improved DEM in the Madison area would have prevented these costly errors and delays.

Benefit – Improved elevation data linked with bathymetry data will benefit shipping by reducing accidents and enhancing the ability to maximize loads (draft of ships), etc.

Could use graphic of a State map, showing the portion of the State where digital floodplain maps exist, or don't exist.

Comment – If NOAA legislative liaison office can provide ideas on pictures and bullets, Forum attendees are willing to help locate specific examples.

Comment – Good to emphasize that “NGS is providing guidance and direction, but that the WI-HMP is to be designed and implemented by State and local governments, and the private sector, to address problems at the State and local level.”

I-Teams – I-Teams, proposed by OMB as part of their Information Initiative on “Collecting Information in the Information Age,” was suggested as an option that might be useful in obtaining additional support for the WI-HMP. Utah, under the leadership of Dennis Gorham has developed a plan for 17-18 data themes. Information on I-Teams can be found at:

www.fgdc.gov

Under “OMB Information Initiatives”

Then under “Implementation Plans” in the “Action” section

Information – Beth F. Nachreiner, WisDOT federal legislative liaison
Room 132B
4802 Sheboygan Avenue
Madison, WI 53705
608-264-9523
beth.nachreiner@dot.state.wi.us

Procedures/Assignments to Assist in Preparing Report from NOAA to Congress:

1. Paul Hartzheim, WisDOT will provide:
 - C maps and data on bench marks (A, B, C, stability, GPSable, etc., in phases 1 thru 5 of WI-HMP)
 - C graphics and text regarding the high speed rail project (ellipsoidal projection, calibration problem)
 - C information regarding obtaining the SEWRPC support
2. Dr. Hart and Jerry Sullivan
 - C relevant information regarding the WLIP results
3. Dr. Hart
 - C Lake Michigan and Lake Superior shoreline examples (shoreline mapping, erosion, lake level changes and impacts)
4. Jerry Sullivan will provide:
 - C FEMA contact
 - C how HMP ties to military affairs activities

5. David Moyer will provide:
 - Ⓒ Contact in DATCP (thru Nick Neher)

6. Mike Czechanski will provide:
 - Ⓒ contact regarding agriculture uses including:
 - Ⓒ Fred Madison
 - Ⓒ Mark Pollock (Conservation Reserve Program)

7. David Moyer will contact Al Lulloff, Wisconsin DNR, regarding:
 - Ⓒ appropriate contact regarding Dam Safety data needs

8. Dave Zilkoski will follow-up on:
 - Ⓒ obtaining photos from web sites discussed at Forum

9. Paul Hartzheim will contact Jack Calvin, Trimble Navigation, regarding:
 - Ⓒ headlines
 - Ⓒ web sites
 - Ⓒ floods and dams

Louisiana Meeting Notes

Kurt Shinkle's notes from the meeting in Baton Rouge, Louisiana, held on August 13, 2001:

Dr. Roy Dokka of Louisiana State University (LSU) gave a brief introduction.

Charlie Challstrom, NGS Director, made a presentation reviewing the implementation history of the height modernization program.

Juliana Blackwell made a more focused presentation on her need for information to complete a report to Congress on implementing height modernization in Louisiana. A draft of the report was distributed. Her preliminary assessment of tasks to be done included:

- Ⓒ establish a consistent datum (i.e., NAVD 88),
- Ⓒ relate existing datums to NAVD 88,
- Ⓒ provide technical guidance on how to extend and use the reference infrastructure.

Ms. Blackwell presented a starting list of potential state issues with height modernization, which included:

- Ⓒ safety/flooding
- Ⓒ navigation/ports
- Ⓒ agriculture/aquaculture
- Ⓒ land surveying

A potential implementation plan for Louisiana included these steps:

- Ⓒ use GPS and levels to establish a framework,
- Ⓒ expand CORS and subsidence monitoring network, and
- Ⓒ create a Louisiana Spatial Reference Center.

Ms. Blackwell concluded by reviewing the plans and recommendations discussed in Wisconsin.

Mr. Challstrom elicited comments and information from the assembly on sources of information that would best explain to Congress the importance of height modernization.

Tony Cavell of NEI made a brief statement supporting the use of modern technology and encouraging support and action in this regard. He reviewed a few examples of the problems caused by an incomplete and inaccurate vertical reference system.

Sharon Balfour of the Louisiana Department of Transportation (LADOTD) cited the flood control and cost/benefit aspects of the U.S. Army Corps of Engineers (USACE) projects based on good elevation data. She mentioned levees and subsidence studies as two examples. She also mentioned a new reconnaissance study for hurricane protection levees, to expand protection of low-lying areas.

Dietmar Rettscheir of the Amite River Basin Commission cited their flood management program as an example of the need for good elevation references. He outlined their plan and talked about the importance of the vertical infrastructure to their effort. He also mentioned the applicable Federal Emergency Management Agency (FEMA) requirements and how reliable, accessible benchmarks were essential to creating and using FEMA models.

Mr. Challstrom talked about relating height modernization to flood elevation certificates and insurance industry interest, through FEMA. He noted how improved elevation control could help expand and improve the coverage, prediction, and protection.

Steve Hebert of 3001, Inc., cited relevant project examples:

- C “cajun everglades” restoration bill being pushed by Congressman Billy Tauzin,
- C inland waterways mapping,
- C flood control projects along the Amite River.

Mr. Hebert promised to send copies of articles and documents on these projects.

Dr. Dokka described the LSU Continuously Operating Reference Stations (CORS) initiative. They anticipate pending installation of 3 CORS sites, with 3 more awaiting funding through USACE. He talked about his desire to facilitate public/private cooperation, especially to expand the state’s CORS network. He also mentioned precision farming applications as an example of business opportunities needing support of an improved elevation reference infrastructure. Finally, Dr. Dokka noted LSU’s leadership in setting up a positional reference infrastructure for Louisiana.

Mike Mayeaux of C. Jack Stelly Surveyors asked about plans to disseminate “gauge data.” He cited problems with gauge data and the lack of a consistent reference system for the gauges. Mr. Challstrom pointed out that he was probably talking about the United States Geological Survey (USGS) stream gauge data, although it was still a valid example of the need for height modernization action. Mr. Challstrom mentioned a renewed effort to work with the USGS to relate stream gauge data to NAVD 88, and to “clean up” errors in the vertical reference systems.

There was a question about incorporating USACE gauge data and datums into the national system. Paul Gautreau of the USACE mentioned that the USACE was actively working to move to NAVD 88 for its tide and water level gauges.

John C. Wells of LADOTD made some comments concerning the positional and vertical accuracy of CORS sites, indicating the importance of height modernization, education and coordination.

Brent Yentes of NASA/LSU, briefly described a Bathy/Topo demonstration project in Louisiana to evaluate bathymetric and topographic data and to compare it against LIDAR data. He indicated that the project involved cooperation with the National Ocean Service (NOS) and USGS. He mentioned that they compiled the test data within a GIS environment. He noted that the project demonstrated the excellent coordination among the participants. Mr. Yentes mentioned that they were working with Dr. Dennis Milbert of NGS on this project, and that U.S. Senator John Breaux was a major sponsor.

Hampton Peal of the Louisiana Geological Survey described their pipeline mapping activities as a use for improved vertical reference infrastructure. He said they find exposed pipes and wellheads where they should not be exposed. These exposed facilities pose a hazard for navigation and for damaging chemical spills. He indicated that subsidence was the suspected cause, but that they weren't sure. Mr. Peal noted that they have been working with USGS on this. He promised to send details and examples.

Mr. Challstrom noted that energy related activities were excellent candidates for topics for the report.

Mr. Challstrom also mentioned that NGS would like to know about any web sites related to height modernization that should have links from the NGS website. He also described how a steady flow of information and activities in this area into NGS could be used to help everyone concerned.

- C Mr. Rettscheir promised to send information on a draft bill related to LIDAR data for urban planning.
- C Ms. Balfour said that the LA GIS Council has a web site that they would like to link to the NGS site. She also noted that they would love to have the NGS State Advisor Bob Zurfluh participate in their next meeting.